Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division

COMMENTS

Draft Final CMS/FS Report Rocky Flats Environmental Technology Site
881 Hillside Area (Operable Unit No 1) August 1994

GENERAL COMMENTS

1) General Lack of Response to Division Comments The Division finds that the DOE has in general failed to adequately respond to or resolve the vast majority of our comments and concerns in this draft CMS/FS report These concerns were discussed with DOE staff in several meetings and are documented in the Division s comments to TM 10 and TM 11 The DOE s failure to resolve these comments has resulted in the submittal of an incomplete and inadequate draft CMS/FS

2) Role of the State and RCRA Corrective Action in Remedy Selection This Draft CMS/FS is entirely focused on CERCLA and the CERCLA process No attempt has been made to meet the State s RCRA/CHWA requirements Under the IAG the State will make a Corrective Action Decision under RCRA/CHWA and the EPA will make a Remedial Action Decision under CERCLA The CMS/FS must be adequate to support both Agencies decisions The IAG specifically requires that Feasibility Studies / Corrective Measures Studies comply with the requirements of CERCLA RCRA CHWA and pertinent guidance and policy [paragraph 152] The Division has stated on many occasions both formally and informally that the CERCLA process is only a template and some modifications to the process will be necessary to meet RCRA/CHWA CMS requirements The DOE has repeatedly ignored these Division concerns

In this draft CMS/FS report the DOE s position continues to be that consistency with CERCLA RI/FS guidance takes precedence over meeting RCRA/CHWA CMS needs and requirements The DOE s failure to address this issue has resulted in the submittal of a deficient CMS/FS document that does not meet the State s needs in making a corrective action decision for all IHSSs in OU 1 The DOE must fully recognize and meet all RCRA/CHWA requirements in the Final CMS/FS and where necessary deviate from CERCLA FS guidance to meet such requirements Consistency with CERCLA guidance is not sufficient justification for ignoring the Division s concerns and comments

3) DOE Inappropriate Proposal for a CAMU The DOE has proposed as part of all remedial alternatives for OU 1 that the Division designate the 881 Hillside at RFETS as a corrective action management unit (CAMU) The DOE s sole intention in proposing this designation appears to be avoiding the active clean up of the hillside The Division is bewildered by the DOE s apparent lack of understanding of the intent and substance of the CAMU regulations The intent of CAMU is to facilitate an effective and efficient remedy not to avoid the need for active corrective action The Division finds the application of CAMU proposed by the DOE

in this document to be inconsistent with the intent of the CAMU regulations and both the substantive and administrative requirements of CAMU

The Division is extremely disappointed that we were not consulted on this proposal or notified of the DOE s intention to apply CAMU at OU 1 prior to the submittal of this CMS/FS report Based on our evaluation of all information available under OU 1 the Division finds no basis for designating OU 1 a CAMU If the DOE can provide sufficient information supporting the appropriateness of a CAMU at OU 1 this information must be discussed and a CAMU designation agreed to by the Agencies prior to its inclusion in the Final CMS/FS

4) Information Necessary to Support a Corrective Action Decision This comment was originally made to TM 11 and has not been resolved to the Division s satisfaction in the Draft CMS/FS The draft CMS/FS does not contain sufficient information to support a CAD for all of the IHSSs in OU 1 The Division will not consider the Final CMS/FS to be complete until all IHSSs and/or source areas in OU 1 are sufficiently addressed This draft CMS/FS only addresses contamination at IHSS 119 1 at a minimum the group of IHSSs south of Building 881 IHSS 130 and IHSS 119 2 must also be evaluated

This concern was raised in the Division s comments to the draft TM 11 and clarified in a meeting with DOE and EG&G staff The DOE formally responded to this concern on September 30 1994 almost a month after releasing the draft CMS/FS The Division finds the DOE response to this comment inappropriate inaccurate and inconsistent with both the IAG and the risk screening approach that all parties agreed to

The evaluation of each IHSS is consistent with the CERCLA process and has been recognized be the EPA as necessary and appropriate for all OUs at RFETS Regardless of CERCLA guidance the Division requires the CMS/FS contain sufficient information to fully support a corrective action decision by the Division under RCRA/CHWA for each IHSS and/or source area in OU 1

The DOE disagreement with the Division s application of the risk screening approach is concerning This screening methodology was agreed to by all parties including the DOE

The development of remedial action alternatives must start at the IHSS and/or source level Corrective measures must be selected for each IHSS and/or source area that

are fully protective and meet all appropriate RAOs and PRGs The number and range of alternatives evaluated for each IHSS and/or source area may be limited by the scope and complexity of contamination and availability of treatment options Alternatives selected for each IHSS should then be combined to form a range of remedial action alternatives for the operable unit When appropriate IHSSs with similar effective alternatives can be combined to achieve economies of scale Alternatives developed at the operable unit level must provide the range of alternatives prescribed in EPA guidance

The Division recognizes that it may not be efficient to address all contamination strictly through IHSSs In some instances it may be more efficient to address an area of contamination as a source area independent of the IHSSs This does not mean that each IHSS does not need to be addressed.

The DOE statement in response to this comment under TM 11 that the groundwater contamination at the eastern edge of the operable unit has not been definitively tied to any one IHSS is correct but totally misleading As reported in the OU 1 RFI/RI Report this contamination was in fact attributed by the DOE to multiple IHSSs although not definitively To definitively tie the contamination on the eastern edge of OU 1 to IHSS 119 2 and/or the 903 Pad would require additional largely unnecessary characterization field work Regardless of the source of contamination near IHSS 119 2 it must be addressed in the OU 1 CMS/FS

5) RCRA/CHWA Criteria for the Evaluation of Final Corrective Measure Alternatives
The Division will use the RCRA corrective action evaluation criteria presented in the latest version of the RCRA Corrective Action Plan (OSWER Directive 9902 3 2A May 1994) a guidance document produced by EPA for implementation of RCRA corrective action as guidance in evaluating remedial action alternatives These standards reflect the major technical components of remedies including cleanup of releases source control and management of wastes that are generated by remedial activities

The specific standards as set out in the RCRA CAP guidance include 1) protect human health and the environment 2) Attain media cleanup standards set by the implementing agency 3) Control the source of release so as to reduce or eliminate to the extent practicable further releases that may pose a threat to human health and the environment 4) Comply with any applicable standards for management of wastes 5) Other factors Other factors include five general factors that will be considered as appropriate by the Division in selecting a remedy that meets the four standards above The five general factors include a Long term reliability and effectiveness b Reduction in the toxicity mobility or volume of waste c Short

term effectiveness d implementability and e Cost

RCRA/CHWA corrective action remedies must meet the above listed standards Therefore the Final CMS/FS must provide detailed documentation of how the potential remedy will comply with each of the Five RCRA CAP standards

6) Effectiveness of Remedial Action/Corrective Action to Protect the Environment This comment was originally made to TM 11 and has not been resolved to the Division s satisfaction in the Draft CMS/FS

The general assumption that remedial actions at OU 1 that are protective of human health will adequately protect ecological receptors and environmental resources at OU 1 is not appropriate in the CMS/FS report The effectiveness of each alternative to protect the environment must be evaluated The DOE response to this comment under TM 11 that it is not necessary to consider environmental protectiveness in the OU 1 CMS/FS because the OU 1 BRA EE did not identify any significant hazards to ecological receptors is not an acceptable response

The BRA EE finds that many of the contaminants evaluated in the BRA EE are toxic to ecological receptors at concentrations found at OU 1 but that because of the limited extent of contamination no adverse ecological impacts occur The assumption that contamination is limited and no adverse ecological impacts will occur is not valid under all of the OU 1 CMS/FS remedial alternatives specifically those alternatives which allow contamination to continue to migrate uncontrolled could invalidate this assumption The effectiveness of all remedial alternatives to protect the environment must be fully addressed in the Final CMS/FS

7) Incomplete and Inaccurate Identification of ARARs The Division has commented on several occasions regarding specific deficiencies in the identification of ARARs ror OU 1 The Division has expressed major concerns with the DOE s identification and determination of ARARs under TM 10 The majority of the Division s comments and concerns regarding ARARs have not been adequately addressed and remain unresolved in this draft CMS/FS In comments to TM 11 the Division deferred ARARs comments in hope that several outstanding issues could be resolved through the ARARs Working Group Unfor unately the DOE has chosen to proceed at an extremely slow pace under the ARARs working group and the group has yet to entertain substantive ARARs discussions

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The Division s general comments on specific potential ARARs are presented below Additional ARARs comments are also included in the Division s specific comments All ARARs issues must be resolved in the Final CMS/FS before the Division will consider the document to be complete

a) State Groundwater Standards The DOE has failed to present any valid argument to support its claim that the State groundwater standards are not ARARs This document states that groundwater standards are not addressed ARARs because the classifications requiring those standards have not been applied consistently throughout the State and thus fail the NCP criteria of general applicability in 40 CFR 300 400(g)(4) This argument much like the last two arguments against the application of State groundwater standards as ARARs is simply incorrect Contrary to this argument the phrase general applicability has nothing to do with whether or not standards have been applied consistently The preamble to the NCP explains that of general applicability means that potential State ARARs must be applicable to all remedial situations described in the requirement not just CERCLA sites Consistent with the preamble s explanation State groundwater standards are applicable to all situations not just CERCLA sites and therefore are of general applicability Moreover no classifications exist for organics rather the standards for organics apply statewide regardless of classification Therefore the claim that the classifications requiring those standards have not been applied consistently makes no sense

b) RCRA/CHWA Subpart F Groundwater Protection RCRA/CHWA groundwater protection standards were identified in the Division s comments to TM 10 as potential chemical specific ARARs They have not been included in the draft CMS/FS These standards must be identified as potential ARARs in the Final CMS/FS

c) Doctrine of Sovereign Immunity The DOE in response to Division and EPA comments on sovereign immunity has stated that it has removed such language from the text of the CMS/FS but that questions regarding sovereign immunity may still be discussed during ARARs working group meetings The Division and EPA positions on sovereign immunity appear to be clearly presented however if the DOE has any remaining questions at OU 1 they must be raised under this CMS/FS Report

d) Surface Water Standards State surface water standards were identified in the Division s comments to TM 10 as potential chemical specific ARARs They

have not been included in the draft CMS/FS These standards must be identified as potential ARARs in the Final CMS/FS

e) Closure of French Drain -- The requirements for the final closure of the french drain must be identified as ARARs and included in the detailed analysis of alternatives

f) Radioactive, Hazardous and Mixed Waste Landfill Requirements The Division considers IHSS 130 to be a mixed hazardous waste landfill which must be closed in accordance with all applicable landfill regulatory requirements Therefore the DOE must identify all ARARs and TBC associated with landfills in this CMS/FS This determination is based on the documented disposal of radioactive waste in the IHSS the known or suspected disposal of hazardous waste debris associated with the OPWL in the IHSS and the detection of hazardous waste constituents in groundwater monitoring wells directly down gradient of the IHSS This landfill is located on an unstable hillside is not capped and has no controls in place to prevent future release or exposure to hazardous constituents or radionuclides Regardless of the current risk associated with IHSS 130 the DOE must meet all appropriate regulatory criteria for landfills The DOE must identify all ARARs relevant to solid radioactive hazardous and mixed waste landfills

8) Point of Compliance with Preliminary Remediation Goals The DOE has incorrectly determined Women Creek as the point of compliance for protectiveness and ARARs requirements at OU 1 State groundwater standards are applicable to all groundwater in OU 1 The point of compliance for groundwater PRGs at OU 1 is therefore anywhere that groundwater is present at OU 1 That is they both must be met The correct point of compliance must be incorporated into this report and utilized in the development and screening of alternatives Once a remedy is selected a new point of compliance for remedy effectiveness will be chosen and specifically delineated

9) Selection of Preliminary Remediation Goals The DOE has selected State MCLs as PRGs for OU1 in this draft CMS/FS While the Division considers State and Federal MCLs to be potential ARARs for OU 1 the Division does not find that State MCLs are necessarily the appropriate PRGs for all contaminants for either IHSS 119 1 or the OU Sufficient documentation supporting how and why the DOE selected State MCLs as PRGs for OU 1 is not included in the CMS/FS Report The rationale for

selecting State MCLs over risk based PRGs or other ARARs is not included in the draft CMS/FS PRGs should be the lower of chemical specific ARARs or risk based PRGs that exceed background and appropriate PQLs Compliance with ARARs and protection of human health and the environment are two distinct CERCLA requirements for remedies PRG selection must be correctly implemented and fully documented in the Final CMS/FS

10) Development of Preliminary Remediation Goals The Division does not find that the PRGs developed in section 2 3 of this draft CMS/FS adequately address all of the RAOs presented in Section 2 2 or the additional RAOs required in the Division s specific comments The State MCLs selected by the DOE as PRGs for groundwater fail to meet the groundwater RAO as identified in this draft CMS/FS report No PRGs have been developed to ensure protection of groundwater from degradation by subsurface soil contamination under the subsurface soil RAO PRGs must be developed that ensure all RAOs are obtained at OU 1 This includes the complete and accurate identification of all chemical specific ARARs

11) Risk Based PRG Calculation Methodology The Division specifically raised several concerns with the calculation of risk based PRGs in comments to TM 10 The DOE has failed to adequately address many of these comments Many of these issues remain unresolved from the Final Phase III RFI/RI Report The Division approved the Revised Final Phase III RFI/RI Report Rocky Flats Plant 881 Hillside OU1 June 1994 contingent upon DOE s revisions on a limited number of issues These issues cannot simply be addressed by discussing them in the Phase III RFI/RI report comment response section The Division has not been convinced by DOE s arguments and expects compliance with our requests

The Division s major issues included an adequate quantitative assessment of external irradiation both OU wide and at the source a good qualitative assessment of toxicity of PAHs and PCBs and also of those chemicals for which there are not as yet any EPA toxicity factors calculation of intake values for all those chemicals for which there are as yet no EPA toxicity factors an assessment of surface soil exposure to the construction worker receptor and a more objective presentation of the risks As of yet the Division has not seen any revisions Therefore DOE s contention that absolutely no changes will be made in the PRG documents or methodology because similar methodologies were used in the RI/RFI document is premature The Division is particularly concerned by the DOE s refusal to calculate external exposure to radiation by a future resident This calculation is suppor ed

both by RAGS (Part B p 35) and by ICRP 26 and 30

12) Failure to Consider ALL Contaminants This comment was raised in the Division s comments to TM 10 and TM 11 It has not been fully addressed by the DOE and remains a deficiency in this draft CMS/FS report

The Division under its corrective action authority will consider all hazardous constituents found at OU 1 in making a corrective action decision Therefore the CMS must include all contaminants and can not be limited to only the BRA COCs The BRA COC screen was developed to focus the BRA risk evaluation on risk drivers This screen does not preclude non COCs from being present at levels above risk based concern or that need management and monitoring This is evident in Table 5 2 of the draft CMS/FS where many non COCs are shown to be present at OU 1 at concentrations above risk based PRGs As stated by the Division in previous comments the Division requires that all contaminants identified at OU 1 be included and fully evaluated in the OU 1 CMS/FS

13) Subsurface Soils Preliminary Remediation Goals The DOE has repeatedly failed to respond to the Division s concerns that subsurface soil contamination is not being adequately addressed in the CMS/FS The DOE continues to claim that subsurface soils were found not to present unacceptable risk in the BRA and thus do not require consideration This is not correct subsurface soils were indirectly evaluated in the BRA through groundwater pathways many of which were found to present elevated risks

Regardless of the BRA hazardous constituents are present in the subsurface soils within OU 1 and must be evaluated in the RCRA/CHWA Corrective Measures Study and subsequent Corrective Action Decision Therefore subsurface soils must be considered along with groundwater in developing RAOs and PRGs RAOs and PRGs for subsurface soils must be based on risk protection of groundwater and ARARs

14) Inadequate Documentation of Remedial Action Alternative Development and Screening Process The Division does not find the documentation and supporting rationale for the development and screening of remedial action alternatives as presented in TM 11 and the draft CMS/FS to be adequate The Division commented on the development and screening of alternatives in several specific comments to TM 11 The DOE has failed to resolve these comments or address the Division s concerns

The DOE has on several instances chosen to cite CERCLA guidance as a rationale for not addressing the Division s concerns This is not adequate All of the Division s comments must be fully resolved to the Division s satisfaction and integrated into the CMS/FS The CMS/FS must include a thorough documentation of the remedy development and selection process including appropriate supporting rationale It is not appropriate to reference the DRAFT TM 11 for this documentation

15) Impacts of Decommissioning of the French Drain Several of the alternatives presented in this document including the DOE preferred alternative recommend the decommissioning of the french drain The text in several sections discusses decommissioning the french drain by breaching the drain with a backhoe It does not appear that the decommissioning of the drain was considered in modeling of contaminant migration down gradient of the drain Specifically any breach in the drain would become a preferential pathway for transport to Women Creek Contaminated groundwater collected in the decommissioned drain would essentially be discharging directly to Women Creek as surface water This pathway must be considered in modeling the impact of decommissioning the drain

The current modeling assumes that if the french drain were decommissioned contamination would eventually reach Women Creek via continued migration of the contaminant plume down gradient of the drain The fate of contaminated groundwater collected within the french drain after decommissioning must be considered in modeling the impact of such alternatives

Additionally the eventual final closure of the french drain raises many issues that have yet to be considered including potential decontamination methods closure performance standards and potential post closure care requirements for the drain The Division strongly recommends that the DOE fully consider these issues in evaluating the role of the french drain in remedial alternatives at OU 1

16) Role of Institutional and Engineering Controls NCP explains that institutional controls shall not substitute for active response measures as the remedy unless such active measures are determined not to be practicable based on the balancing of trade offs among alternatives (300 430(a)(1)(iii)) Clearly not the case here In any event the use of institutional controls to limit exposure at the site does not alleviate the requirement to meet or waive all ARARs

17) Regulatory Requirements for IHSS 130 Radioactive Site 800 Area Recent groundwater monitoring data for the three monitoring wells directly down gradient of IHSS 130 (36391 36691 37191) show the presence of hazardous constituents not detected during the Phase III RFI/RI sampling The data from two of these wells over the time frame utilized in the RFI/RI (1990 to mid 1992) were limited to only a single sampling event The newer 1993 monitoring data may confirm the HRR report that hazardous waste associated with the OPWL were disposed of at this IHSS and are potentially leaching from this IHSS into the groundwater As a result the Division is currently reviewing this monitoring well data to determine if IHSS 130 is a potential hazardous waste landfill as well as a radioactive waste landfill As such the Division requires that remedial action alternatives be developed for this landfill that are protective of human health and the environment and meet all the appropriate regulatory requirements

18) Use of All Available Data The modeling and analysis of groundwater data in this report must use all available field data Groundwater monitoring data for the hillside is available from 1987 to the present Limiting this report to groundwater data from 1990 to mid 1992 is not appropriate Additionally there is no mention of the December 1993 soil gas survey conducted at IHSS 119 1 The Division requires that all available field data be used in the Final CMS/FS It is important to note that the RFI/RI was performed using data gathered at a finite point in time (1990 to mid 1992) Inclusion of any new pertinent data into the development of the final CMS/FS is essential in order to help ensure an accurate CMS/FS Therefore as new information is obtained and evaluated further field work at OU 1 may be required prior ta a remedy selection

19) Detailed Analysis of Alternatives As documented in the Division s comments the DOE has made many fundamental mistakes in the CMS/FS process including selection of ARARs and PRGs and the development of alternatives The number and degree of these mistakes have forced the Division to conclude that the underlying basis for the detailed analysis of alternatives and the pre erred alternative presented in this draft CMS/FS are fatally flawed and without basis The Division requires that after the ARARs PRGs development of alternatives and all other underlying errors in this report are corrected the detailed analysis of alternatives and DOE preferred remedy be reworked

The detailed analysis of alternatives must include detailed documentation of how the potential remedy will comply with each of the five standards for evaluation of a

final corrective measure alternative presented in the RCRA Corrective Action Plan (OWSER Directive 9902 3 2A) as well as the nine CERCLA criteria Specifically the Division requires the reworked detailed analysis of alternatives to include how the sources of releases will be controlled and to comply with any applicable standards for management of wastes as evaluation criteria

The Division has not specifically commented on section 4 0 Detailed Analysis of Alternatives of this draft CMS/FS The Division finds that based on the number and significance of the unresolved issues the evaluation of section 4 is not warranted at this time This should not be construed as concurrence by the Division on anything contained in Section 4 of the draft CMS/FS

20) Failure to Adequately Consider Risk in Evaluating Alternatives In the CMS/FS document DOE based its decision on whether remediation alternatives protected human health solely on the modeled predictions of the fate and transport of one chemical PCE They did not discuss CCl4 1 1 DCE or any other hazardous constituents This is unacceptable RAGS Part B states that all chemicals with risks greater than $1x10^{6}$ should remain on the list of chemicals of potential concern for that medium (RAGS part B p 16) A remediation decision based on only one chemical does not consider the cumulative risks from all chemicals in a particular media In this case the remediation decision does not even consider the risks from CCl4 and 1 1 DCE both of which are more toxic and present in higher concentrations at OU1 than PCE Moreover HQs were not even calculated for inhalation exposure (see Tables C 6 4 5 & 6) because no inhalation RfD was available for PCE

If DOE had done a toxicity assessment on this chemical it would have been apparent that there is no evidence that this chemical causes local respiratory tract irritation so that it would be appropriate to do route route extrapolation on the oral toxicity factor for this chemical As it is DOE did not even evaluate the single chemical it assessed in the CMS/FS for noncarcinogenic effects by the inhalation route of exposure

21) Groundwater Modeling This model is a first attempt to describe a complex system and as such tends to raise as many or more questions than it answers about the conceptualization of the source locations and inclusion of decay products The concept of a single flow line within a preferential channel may not adequately describe the flow system between the chosen calibration wells Slumping is an

active process on the hillside and may interrupt what appears to be a bedrock low channel Current top of bedrock information may not be detailed enough to define a single flow path accurately therefore this model represents a theoretical flow path with a gradient similar to flow paths that may exist on the hillside Only one conceptualization of the source was considered a residual DNAPL located in one cell at the bedrock/alluvium interface Alternate source conceptualizations such as diffusion into the pore waters of the bedrock between fractures were not mentioned The model shows a fair amount of contaminant moving through the bedrock portion of the model so a source within bedrock could be important Discussion of the choices made in the model conceptualization is an important element in model documentation

Contaminant calibrations were apparently performed with less than the full suite of available data and not all contaminants in the PCE decay chain were considered The source and location of each succeeding contaminant becomes dispersed from the transport of its parent product Such complex linkage of contaminant models becomes too difficult for a transport model dealing with one product at a time Recognition of this complexity would indicate this model is not conservative

The English/Metric conflict is not yet resolved in this country Data in this report is presented in metric units but the model is run in English units and the conversions are not presented The best option seems to be to present both to facilitate review of the model

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SPECIFIC COMMENTS

Executive Summary

Page 11 The text in this section states Because surface soil risks fall within the acceptable risk range of 10 4 to 10 6 and because surface soil hotspots are being addressed through a recent Proposed Action Memorandum (PAM) alternatives were not developed for this medium as the RAOs are already achieved This statement is not consistent with the DOE s proposal to transfer the further study and remediation of surface soil contaminants at OU 1 to OU 2 (94 DOE 07024) which all agencies have agreed is appropriate Additionally as stated on many previous occasions the Division does not consider the risk range 10 4 to 10 6 to be acceptable

Page iv The Executive Summary must clearly identify and distinguish statements which are solely the opinion of the DOE The Division does not agree with the DOE opinion that the detailed analysis of alternatives demonstrates that Alternative 1 Institutional Controls without the French Drain is the preferred alternative for groundwater remediation This is at best a DOE recommendation and must be identified as such

Page v The State s acceptance of the CMS / FS Report will be evaluated through the State s review and approval of the CMS/FS Report All concerns expressed by the Division must be fully addressed to the Division s satisfaction before the Final CMS/FS is approved not just evaluated

Section 1 1 Purpose and Organization of Report

Section 1 1, Page 1 1 This section states that this report is based on the CERCLA process This report is both a CERCLA Feasibility Study and a RCRA Corrective Measures Study The CERCLA process is being used as a general guide however it must be recognized that modifications to the CERCLA process must be made to ensure the CMS/FS satisfies both CERCLA and RCRA/CHWA requirements Additionally this section refers to CERCLA guidance as methods proposed by EPA These statements give the misleading impression that the EPA has specifically proposed the use of this methodology at RFETS when in fact the methodology was merely developed by EPA as guidance The introduction to this report must clearly acknowledge the intent to meet both CERCLA and RCRA/CHWA requirements

Section 1 1, Page 1 3 This section states that Technical Memorandums (TMs) 10 and 11 were submitted to the CDPHE and EPA for review but will not be finalized The

TMs are referenced as documenting the development of several critical aspects of the remedy development and selection process However the text fails to acknowledge that the Final TM 10 was specifically disapproved by both the Division and the EPA All references to TM 10 in the report must include a statement that the Final TM 10 was disapproved by the Agencies

Section 1 1, Page 1 4 The statement First each alternative is evaluated individually on its ability to satisfy the nine criteria on page 1 4 is not accurate This report does not currently evaluate two of the nine CERCLA criteria (State acceptance and Community acceptance) As discussed in the general comments to this report alternatives must be evaluated against the five RCRA CAP standards as well as the nine CERCLA criteria

Section 1 2 Background Information

Section 1 2, Page 1 6 The production process at RFETS resulted in the generation of radioactive waste hazardous waste and mixed waste

Section 1 2 1, Page 1 7 881 Hillside Site Background and Description In describing the operations of the drum storage areas at IHSS 119 1 and 119 2 the text in this section states that the drums possibly contained some radionuclides This is not accurate based on the presence of radioactive hotspots and the documented sources of the waste stored in these IHSSs the drums are known to have contained radionuclides

Section 1 2 Page 1 11 Why is it that more water is available in January than in April? The spring runoff is the high water period for the hillside How much water is available on the hillside during peak flow?

Section 1 2 Page 1 11 Please clarify the statement data from April 1993 a month showed that most of the UHSU monitoring wells were dry Does this refer only to wells below the french drain? If most wells were dry which wells were not dry?

Section 1 3 Nature and Extent of Contamination

Section 1 3, Page 1 11 Nature and Extent of Contamination The OU 1 contaminan s identified in Table 1 2 are qualified in this section as being those originally identified Does the DOE plan to revisit the identification of contaminants at OU1? The Division reques s clarification of the need and intent of this caveat

Table 1 2 Contaminants Identified in the RFI/RI by Media, Page 1 12 The Division does not believe that it is appropriate to qualify the contaminants identified in subsurface soils as not resulting in cancer risk greater than 10 6 nor a hazard index greater than unity As stated in previous Division comments subsurface soil contamination contributes to risk through groundwater pathways that are above the 10 6 level

Table 1 2 Page 1 12 The shaded media in this table were not directly evaluated in the RFI BRA Subsurface soils did contribute to groundwater contaminant pathways in several exposure scenario that resulted in elevated risk Surface water and sediments were not evaluated in the OU 1 RFI but were instead administratively transferred to OU 5 These facts must be accurately represented in this Table What is the intended purpose of qualifying media with the a note in this Table? The DOE s definition of COC as used in this Table is unclear to the Division Specifically how are the COC in Table 1 2 different from the COC listed on page 2 2 of section 2 1 Contaminants of Concern Are all contaminants identified in a media considered COC in this Table?

Section 1 3 Page 1 14 What is the basis for determining that 1 000 ug/l groundwater and 1 000 mg/kg VOC in subsurface soils is a high or low concentration? The Division considers any contamination above groundwater standards to be a high concentration in groundwater The discussion of subsurface soil sources should be clarified and state the suspected presence of residual and/or free phase DNAPL

Section 1 3, Page 1 14 Occurrence of toluene This discussion must clearly state that after much effort the DOE has not been able to confirm that toluene is either a field or laboratory introduced contaminant

Section 1 3 1 Page 1 14 The Division agrees that remedial measures need to evaluate individual groundwater plumes direct y When did the DOE plan for this evaluation to take place? It appears that the DOE has only attempted to evaluate the groundwater plume at IHSS 119 1

Section 1 3 1 IHSS 119 1 Area Page 1 17 The RFI concluded that multiple source releases in different areas with distinct chemical composition occurred across IHSS 119 1 How was this accounted for in ground ater modeling at IHSS 119 1? The groundwater modeling is based on a single source well (4387) and ignores a potential source at 1074 that also appears to be influencing 0487

Section 1 3 1 Page 1 17 Last paragraph This paragraph does not make any sense

Is text missing from this section? What unidentified source area? The one on the eastern end of the IHSS? Will the high soil gas results be investigated?

Section 1 3 1 Page 1 18 IHSS 119 2 Area Please be more specific as to what area outside the OU is the potential VOC release point for contamination at wells 62866 and 6?86 What evidence supports this claim?

Section 1 3 2 Page 1 21 The statement vanadium is the only contaminant detected at this location over background levels is not accurate and is misleading Plutonium and Americium levels above background were detected in the subsurface soils from several boreholes at IHSS 130 Also it is documented that Plutonium and Americium contaminated debris was disposed of at IHSS 130 Chlorinated solvents have also been recently detected in all three monitoring wells down gradient of the landfill The Division considers IHSS 130 to be a mixed waste landfill This information must be accurately presented in the CMS/FS

Section 1 3 3 Page 1 21 This section must also note that PAH were disposed of at the IHSS 130 landfill in the form of fire debris and asphalt Also the fires on plant site are another source of surface soil PAH contamination

Section 1 3 4 Page 1 21 Sediments are not addressed as part of the OU 1 CMS/FS and were not fully investigated or evaluated in the OU 1 RFI/RI What is the DOE s basis for concluding that PCBs found in OU 1 sediments are not of OU 1 origin? Also this section must be clearly state that the reason the release mechanism is unknown is that it has not been investigated Several PCB contaminated areas are located up gradient of OU 1 in the industrial area of the plant

Section 1 3 1 Area South of Building 881 Page 1 14 According to the RFI/RI groundwater in this area contains widespread and relatively dilute concentrations of chlorinated solvents This is not the same as generally low concentrations which is used to describe the area in this report This section must accurate v describe the contamination found in this area of the OU

Section 1 3 1 Page 1 14 This section generally concludes that no source exis s in the building 881 area for the VOC contamination This is not consistent with the RFI/RI or fate and transport discussions in this report Section 1 4 1 on page 1 ?6 states In the area south of 881 the release mechanism likely to have accrued include leaking pipelines and leaks from impoundments and disposal pits Sect on 1 3 1 must accurately reflect the findings and conclusions of the RFI/RI

Section 1 4 Fate and Transport of Contaminants

Section 1 4 1 page 1 26 An additional migration pathway for any DNAPL that has come to rest on the clay stone is migration through fractures in the clay stone and diffusion from the fractures into the clay stone (see RFI/RI page 5 29)

Section 1 4 1 Page 1 28 This section states that it is not likely for the aqueous phase hydrocarbon plumes in groundwater will discharge to Women Creek due to the low initial volume of contaminants of concern available for transport This section is not consistent with the modeling presented later in this report and must be corrected or deleted Also we are concerned with all contaminants not just BRA COCs

Section 1 4 1 Page 1 28 The text concludes that the COC concentration found to date limit the amount of contamination available for transport This is not consistent with the known presence of DNAPL and high contaminant concentrations around the 903 pad which the DOE is hypothesizing to be a source of the groundwater contamination in the eastern portion of OU 1 Furthermore the RFI/RI states that a source of groundwater contamination exists at 119 2 that has not been identified (RFI/RI page 4 74)

Section 1 4 1 Page 1 29 The Division does not agree that toluene has relatively high volatility Of the VOC contaminants found at OU 1 toluene is in fact the least volatile

Section 1 5 Baseline Risk Assessment

Section 1 5 1 Page 1 33 The Division does not consider the DOE evaluation of groundwater yield to be part of the RFI/RI BRA This statement is misleading and not relevant to the BRA

Section 1 5 1 Page 1 33 The statement that only the groundwater and surface soils media present a risk greater than the risk range 10^{-4} to 10^{-6} is not accurate While the BRA showed that exposure to groundwater presented elevated risk the full pathway resulting in this exposure also included the subsurface soils media Additionally dermal exposure to subsurface soils was never directly evaluated in the BRA

Section 1 5 1 Page 1 33 These are exposure scenarios not land use scenarios The

inconsistent use of terminology is very confusing and potentially misrepresents this work

Section 1 5 1 Page 1 33 The discussion of the hotspot removal action should specify that the removal was to local background levels since several background measurements are available at RFETS The Division was not aware that risk from the removal of the hotspots was calculated in the BRA What is the specific reference? What assumptions were make regarding the hotspot removal?

Section 1 5 1 Complete and Unbiased Presentation of BRA Uncertainties The hotspot data causing an overestimate of risk from surface soil radionuclide exposure is only one of several uncertainties associated with the RFI/RI BRA There are many other uncertainties that may result in either an over or under estimation of risk It is not appropriate to selectively discuss only those uncertainties that may result in an over estimation of risk This also includes the note to Table 1 3 Either discuss all major uncertainties or none One example of potential for under estimation of risk is that many contaminants at OU 1 do not have RfD or slope factors for all exposure pathways resulting in an underestimate of risk

Section 1 5 2 Page 1 36 The EE conclusion that there is no unacceptable risk from exposure to ecological receptors is based on the premise that exposure is limited due to the limited extent of contamination at OU 1 This may be true under current conditions however if the groundwater contamination is allowed to continue to migrate it could invalidate this assumption The risk to the environment must also be considered in the evaluation of remedies Remedial actions can impact the environment

Table 1 5 Page 1 38 This Table must discuss or include all contaminants not only BRA COCs Corrective measures must meet all regulatory requirements as well as being protective The conclusion that no action is required at IHSS 130 is premature This IHSS is a mixed waste landfill and at a minimum must meet applicable landfill closure requirements

Section 2 0
Identification and Selection of Technologies and Representative Process Options

Section 2 0, Page 2 1 This section gives the impression that the DOE received Agency buy in to TM 10 and TM 11 The text states that TM 10 and TM 11 were

submitted to the Agencies but fails to acknowledge that TM 10 was specifically disapproved by both Agencies or that the Agencies comments to the TMs have not been resolved Since the Final TM 10 was disapproved and TM 11 was never finalized it is not appropriate to reference and rely on the TMs for supporting the PRG calculations PRG calculation were a major issue leading to the disapproval of TM 10 by the Division The Division therefore is requiring that the detailed methodology and calculation of risk based PRGs be included in the Final CMS/FS

Section 2 0, Page 2 2 The ecological evaluation (EE) states that many of the contaminants evaluated in the BRA EE are toxic at concentrations found at OU 1 The EE concludes that because of the limited extent of contamination no adverse ecological impacts occur The assumption of limited extent of contamination is not necessarily valid under all of the CMS/FS remedial alternatives The protectiveness of all remedial alternatives to the environment must be fully addressed in the CMS/FS As previously stated the Division requires that the impact or all remedial alternatives on the environment be evaluated

Section 2 1
Contaminants of Concern

Section 2 1, Page 2 2, Contaminants of Concern This section must list all site contaminants identified in the RFI/RI report It is not appropriate to limit the scope of this section to BRA COCs The BRA used a toxicity screen to identify BRA risk drivers The fact that a contaminant was not a risk driver in the BRA does not mean that the contaminant is protective or meets ARARs The Division has commented on this concern on numerous occasions The Division requires that all contaminants identified in the RFI/RI as site contaminants be fully evaluated in the Final CMS/FS report including but not necessarily limited to PRG development and compliance with all ARARs

Section 2 1, Page 2 2 Groundwater contaminants **are** definitely a concern at OU 1 not potentially a concern The list of groundwater contaminants to be evaluated in this CMS/FS must include all contaminants identified in the media not just BRA COCs

Section 2 1, Page 2 3 The administrative transfer of surfacial soil contamination from OU 1 to OU 2 includes all surface soil contaminants not only radionuclides The Division does not agree with the DOE rational for excluding surface soil PAH and PCB from evaluation at OU 1 The DOE has proposed to transfer surface soil from OU 1 to OU 2 including radionuclide PAH and PCB contamination The Division and EPA

have agreed to this transfer Therefore surface soil contamination should not be included in this evaluation

Section 2 1, Page 2 3, 2 4, 2 15 The document states that PAH s and PCB s present a risk of 10^{-5} which is within the acceptable risk range specified in the NCP and therefore these contaminants are not included in the development of remedial action alternatives Again the Division reminds DOE that it does not automatically consider risks above 10^{-6} to be protective These contaminants should be included in the development of remedial action alternatives in the OU 2 CMS/FS

Section 2 1, Page 2 3 The BRA concluded that the risk from the site is unacceptable under several exposure scenario based on current site conditions and therefore warrants further evaluation in the CMS/FS The risk attributed to a media in the BRA is not the only relevant factor in determining the scope of the CMS/FS and the need to consider specific media In the case of OU 1 the subsurface soils are obviously a media of concern since they are a source of contamination that contributes to the unacceptable risk under several BRA scenario (see RFI/RI Figure F4 4) Subsurface soils must be considered a media of concern in the Final CMS/FS Again the Division has previously made this comment regarding OU 1

Section 2 1, Page 2 3 The text states in the last 2 sentences of this section that no contaminants were selected for subsurface soils and that contaminants were selected for subsurface soils This makes no sense

Section 2 2 Remedial Action Objectives

Section 2 2, Page 2 4 RAO Risk Level Goal The Division does not consider risk above 10 6 to be protective The initial goal of remedies as stated in the RAOs must be to reduce risk to below 10 6 A risk range is not appropriate and must not be included in the final CMS/FS

Section 2 2, Page 2 4 Remedial Action Objectives The rational supporting the development of RAOs for OU 1 must be included in the CMS/FS It is not sufficient to merely summarize them in this section Also RAOs should not limit the hazard index criteria to only non carcinogens Carcinogens can also be toxic and must be considered in the development and evaluation of both cancer and toxic hazard protectiveness

Also RAOs must be added for environmental protection These objectives must include both protection of ecological receptors and restoration of environmental

resources (i e ground water) The restoration of groundwater at OU 1 to chemical specific ARARs must be included in this RAO

Section 2 2, Page 2 4 Subsurface Soil RAO This RAO must include or reference specific contaminant levels to measure the protection of groundwater (CERCLA RI/FS guidance Section 4 2 1) It is not appropriate to limit this RAO with the caveat to the maximum extent practicable The Division requires that this goal be stated as Prevent migration of contaminants from subsurface soils to groundwater that would result in ground water contamination in excess of State groundwater quality standards for OU 1 contaminants

Also the RAO for the protection of groundwater from further degradation beneath OU 1 should not be limited to a specific subsurface soil contamination phase (residual DNAPLs) If free phase DNAPL is also present in the subsurface soils they must also be considered

Section 2 2, Page 2 4 The text states These RAOs are used to determine what area or areas of OU 1 require remedial action evaluation and are quantified through the use of PRGs The Division was not aware that this determination had occurred at OU 1 When was this determined and how is it documented This information must be included in the Final CMS/FS

Section 2 2 Page 2 4 The OU 1 Hotspot Removal PAM specifically stated that it is not necessarily intended to be the final remedy for OU 1 surface soils The hotspot removal will not specifically address the RAOs listed in this section and is not sufficient basis for the statement that surfacial soils will result in residual risk within the 10^{-} to 10^{-6} risk range The correct rational for not addressing surfacial soils in this CMS/FS is that they are being addressed in OU 2 Therefore the Division questions the need and usefulness of presenting an OU 2 RAO in this OU 1 CMS/FS

Section 2 2, Page 2 4 The focus of this OU 1 CMS/FS must be on meeting all OU 1 RAOs for all media including but not necessarily limited to groundwater and subsurface soils

Section 2 3
Development of Preliminary Remediation Goals

Sect_on 2 3, Page 2 5 This section exhaustively explains the CERCLA remediation goal development process However this is also a RCRA Corrective Action and all

remediation must meet both RCRA corrective action and CERCLA remedial action requirements This fact and the State s RCRA corrective action authority must be appropriately acknowledged and addressed in this Section of the CMS/FS The fact that CERCLA guidance is being used as the template for this CMS/FS does not eliminate the need to meet RCRA and Division needs

Section 2 3, Page 2 6 The text in this section states that chemical specific ARARs were identified in accordance with CERCLA guidance When did this identification occur and how was it documented? The Division finds the ARARs determination in this draft CMS/FS to be grossly inaccurate

Section 2 3 1 Potential ARARs, Page 2 5 CERCLA provides a statutory basis for determining ARARs in a CERCLA remedial action context Since this is also a RCRA corrective action this section must specifically acknowledge that OU 1 must meet all CERCLA requirements such as ARARs as well as RCRA/CHWA corrective action requirements

Section 2 3 1, Page 2 6 The list of reasons for classifying groundwater as domestic use quality or agricultural use quality are incomplete If any one of the criteria under this regulation is met the water is classified for that use The DOE has only presented two of the criteria to be considered in the domestic use quality classification This is potentially misleading A complete list of all classification criteria must be present Also the groundwater at OU 1 is classified as protection of surface water This classification must also be considered

Section 2 3 1, Page 2 7 The statement The Phase III RFI does not support the CWQCC conclusion that there is ground water beneath OU 1 which could be used as a drinking water supply is very misleading The Phase III RFI/RI Report does not support or refute any conclusions regarding the CWQCC classification of groundwater at the RFETS The classification of groundwater at RFETS by the CWQCC is not within the scope of the Phase III RFI/RI Report Until such time as the CWQCC redesignates the groundwater at OU 1 the State domestic use quality ground water standards are directly applicable to OU 1

Section 2 3 1, Page 2 7 State Engineer Office Letter The opinion of the State Engineer Office regarding the application of a water production simulations on the 881 hillside is not relevant to this CMS/FS Until such time as the CWQCC redesignated the groundwater at RFETS the State domestic use quality groundwater standards are applicable ARARs This letter is irrelevant to this report and must

be removed from the Final CMS/FS

Section 2 3 1, Page 2 7 Petition Change to CWQCC Groundwater Classification The text states DOE may petition the CWQCC when appropriate to consider changing the water quality classification beneath OU 1 When will this petition be appropriate Until the CWQCC redesignates the groundwater it must meet domestic use quality standards as well as agricultural use quality and surface water protection standards

Section 2 3 1 Page 2 7 Potential Groundwater ARARs The identification of potential groundwater chemical specific ARARs for OU 1 is incomplete inaccurate and fails to address the Division s previous comments Along with domestic use quality the groundwater beneath OU 1 is currently classified by the CWQCC as agricultural use quality and surface water protection All three State groundwater classification standards and the basic Statewide groundwater standards are applicable at OU 1 and must be identified as such in the final CMS/FS This fact was included in the Division s comments to TM 10 All potential State and Federal groundwater ARARs must be identified in this section including but not necessarily limited to RCRA/CHWA groundwater protection standards drinking water standards and groundwater standards For example the RCRA/CHWA Subpart F Groundwater Protection Standard Concentration Limits (6 CCR 10007 3 264 94) are directly applicable to this OU The Division does not agree with the DOE s rational for the selection of State MCLs as PRGs for the groundwater at OU 1 The DOE has not sufficiently documented the rational for this selection

Table 2 1, Page 2 8 The Division questions the intent of qualifying the contaminants listed in the table as being originally identified in footnote b of this Table Does the DOE intent to modify the RFI/RI contaminant list?

Section 2 3 1, Page 2 9 Potential Surface Soil ARARs The remediation of surface soils at OU 1 will be addressed under OU 2 Therefore this discussion is no longer relevant to OU 1 and should be removed from the Final CMS/FS The Division will comment on surface soil ARARs issues under the OU 2 CMS/FS However as the document points out the AFAR for PCBs is 1 mg/kg PCB Any accedence of this AFAR must be addressed in the OU 2 CMS/FS

Section 2 3 2, Page 2 9 Risk Based PRGs for Subsurface Soils As stated in previous Division comments while the risk from exposure to subsurface soils was not directly evaluated in the RFI/RI BRA the BRA does not support the DOE conclusion that risk from subsurface soils is not greater than 10 6 or a hazard index of 1

Risk based PRGs must be developed for subsurface soils that assure contaminant transfer to groundwater and soil gas do not present unacceptable risks

Section 2 3 2, Page 2 9 Development of Risk Based PRGs The first sentence in this section refers to TM 10 for the development of surface soil and groundwater risk based PRGs The Division and the EPA specifically disapproved TM 10 If the DOE does not plan to finalize TM 10 details of the development of risk based PRGs must be included in this CMS/FS and approved by the Division Risk based PRGs must be developed and reported for all contaminants identified in the Phase III RFI/RI not just BRA PHE COCs As stated previously risk based PRGs must be developed for subsurface soils that assure contaminant transfer to groundwater and soil gas do not present unacceptable risks Also surface soil PRGs are no longer relevant to the OU 1 CMS/FS and should be deleted from this report

The Division specifically requests justification for why only on site resident and commercial/industrial worker scenario were included in the risk based PRG calculations

Section 2 3 2, Page 2 11 Selection of State MCLS as PRGs The Division does not agree with the DOE s apparently arbitrary selection of State drinking water MCLs as PRGs for the evaluation of remedial actions at OU 1 There is no justification offered for this selection Risk based PRGs are not for informational purposes only Risk based PRGs quantify the human health RAOs They must be satisfied in order to ensure a remedial alternative attain human health based RAOs

Table 2 5 Page 2 14 Comparison of Risk Based PRGs, ARARs, TBCs, and Existing Concentrations The shading of non BRA COCs in this table is not appropriate and must be deleted This table presents several potential PRGs that are lower than State MCLs It is not appropriate to select State MCLs as PRGs when risk based PRGs or other ARRAs are lower for a contaminant It should also be pointed out that several of the site contaminants that were not selected as COCs in the BRA are present at OU 1 above risk based PRGs

Table 2 3 Page 2 12, Table 2 4 Page 2 13, Section 2 3 2 Page 2 11 Risk Based PRGs The Division requires that all OU 1 contaminants as identified in the Phase III RFI/RI report be included in tables reporting risk based PRGs Risk based PRGs are included in Table 2 5 there is no reason for not including them in these tables

Section 2 3 2 Page 2 11 ALARA Discussion The discussion of ALARA principles is not appropriate under this section of the CMS/FS ALARA has not currently been

identified as AFAR and is therefore not relevant to the development of preliminary remediation goals Based on the text presented in this section ALARA is more appropriate as an action specific AFAR or TBC The Division recommends that this discussion be removed from this section of the Final CMS/FS Additionally the decision as to how to address ALARA at OU 2 is not appropriate in this OU 1 CMS/FS and must be deleted

Section 2 4 General Response Actions

Complete Documentation of General Response Actions Several general response actions are currently assumed by this technical memorandum to be part of groundwater remediation alternatives but are not formally documented as such It is critical to the development and screening of remedial action alternatives that the complete list of all GRA for each alternative be considered The description of each GRA must include a complete description of all actions singularly or in combination that would be taken to satisfy the remedial action objectives for an area This was a comment to the draft TM 11

Section 2 4 Page 2 15 GRA for Subsurface Soils This section of the report is unclear and potentially inconsistent regarding subsurface soil GRA at OU 1 It first states that GRA will only be developed for groundwater and then in the next sentence states that GRA will be developed for both groundwater and subsurface soils GRA must be developed for all media of concern including groundwater and subsurface soils This requirement must be clearly stated in the text and applied in this section The subsurface soil RAO and PRGs (if DOE had adequately developed PRGs) can not be addressed without subsurface soil GRAs It is not appropriate to address subsurface soils under the umbrella of groundwater GRAs This acknowledgement that subsurface soils are in fact being remediated will help to clarify and more effectively organize the presentation of remedial alternatives

Section 2 4 1 Page 2 15 Surface Soil PRGs This section should be deleted from the report It is not relevant to the OU 1 CMS/FS report because surface soils will be addressed under OU 2 In any event the Division does not believe that the RFI/RI necessarily supports the stated conclusion regarding surface soil risk after the removal of radionuclide hot spots A specific reference to this finding in the RFI/RI is needed before this statement will be accepted in the Final CMS/FS

Section 2 4 2, Page 2 16 Clarification of Institutional Controls The Division requests clarification of the DOE s intended scope of controls under the

institutional controls GRA Specifically institutional controls do not include engineering controls such at fences and other physical site access controls Additionally the Division requests details as to how the DOE plans to demonstrate that institutional controls will be permanently maintained Does the DOE have the authority to implement deed restrictions and other institutional controls at a federal facility?

Section 2 4 2, Page 2-16 Listing and Description of General Response Actions The list and brief description of groundwater GRA on page 2 16 remains both incomplete and confusing The DOE s response to this comment under TM 11 is not acceptable The Division does not find the description of GRA under TM 11 or the draft CMS/FS to be adequate This GRA listing and description is not consistent with Section 4 2 of the EPA CERCLA FS guidance

Regardless of the DOE s interpretation of EPA guidance the Division s comments must be addressed to our satisfaction The list of GRA is the foundation on which remedial alternatives are developed and evaluated It is imperative that GRA and associated process options be clearly presented and described in this report Each general response action must clearly specify the action(s) media and as appropriate contamination to be targeted For example in situ treatment of chlorinated solvents in subsurface soils and in situ removal of chlorinated solvents from sub surface soils with ex situ treatment are two different general response actions for subsurface soils The GRA for in situ treatment and ex situ treatment are ambiguous without specifying the media of interest

It is not clear to the Division why removal ex situ treatment of chlorinated solvents and some options for in situ treatment of chlorinated solvents are considered separate GRA for groundwater It is the Division s understanding that under most of the process options being considered under these GRA groundwater is to be removed and treated at the building 891 treatment facility

Section 2 4 3, Page 2 17 Designation of Source Areas The first paragraph or this section is incorrect and potentially misleading The fact that IHSS 119 1 has the highest groundwater contamination does not mean that other IHSSs do not require evaluation The Division requests clarification of the intent of the first paragraph and why it is included in this section

The designation of IHSS 119 1 as a source area was in the Nature and Extent of Contamination section not in the BRA PHE The source area at IHSS 119 1 was evaluated in the BRA PHE to quantify risk at the source (an IAG requirement)

Source areas were also identified in the RFI/RI report at IHSS 119 2 and south of Building 881 The identification and designation of source areas has nothing to do with relative contribution to total risk from the site or the fact that IHSS 119 1 contributes a significantly higher risk to receptors exposed to groundwater than other OU 1 sources

Section 2 4.3 Page 2 18 Volume and Area Estimates for All Media Exceeding PRGs This section must present an initial determination of volumes and/or areas of all media to which GRA might be applied All areas that exceed the PRGs for a specific media must be identified and its area and/or volume estimated These estimates are critical to the development and screening of remedial alternatives for the OU To clarify the connection between GRAs and volume/area estimates the GRA associated with each volume/area estimate must be identified This was a comment to the draft TM 11

Section 2 5 Identification and Screening of Technologies and Process Options

Section 2 5 Page 2 18 This section must identify and screen representative technology for each GRA process option The identification and screening process must not be limited to IHSS 119 1 Options must be considered for all IHSSs and/or source areas The CMS/FS must include a summary description of each technology and the rational for its selection It is not appropriate to reference the Draft TM 11 for this information The Division recommends that a Table similar to Table 4 1 page 4 10 of CERCLA RI/FS Guidance showing the linkage between the RAOs PRGs GRAs representative technologies and process options be included in this section Such a Table would clearly illustrate the logical connection between the RAOs and the selected remedial technologies and process options

Section 2 6 Evaluation and Selection of Representative Process Options

Selection of Process Options for Alternative Development The Division requests that additional information be included in this section documenting how and why each specific process option was selected for inclusion or excluded in the selection of process options for developing alternatives It is not adequate to reference the draft TM 11 for this information

Consideration of Innovative Remedial Processes and Technologies In keeping with the new mission of the RFETS the Division questions the DOE s minimal consideration of new and innovative technologies at OU 1 All of the process options selected in this CMS/FS are well documented and proven technologies The Division does not find

this approach to be consistent with the new DOE mission of the advancement of new and innovative technologies for environmental restoration As is evident in the DOE s considering bioremediation at OU 1 it is easy to find excuses for why any new technology may not work at any site The advancement of new and innovative technologies by engineering innovative approaches to apply the technology to OU 1 is much more difficult

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Section 3 0 Development and Screening of Remedial Actin Alternatives

Section 3 0 Page 3-1 Screening of Remedial Alternatives The full development and screening of remedial alternatives must be included in the CMS/FS TM 11 was not finalized or approved by the Division and is therefore not an appropriate reference for this information

Section 3.0, Page 3 1 Existing IM/IRA Treatment System As stated in the Division s comments to TM 11 the existing 891 water treatment system has been shown not to be capable of treating all OU 1 contaminants at their current levels The treatment system currently relies on the french drain to dilute contaminant levels in the collection well prior to treatment The DOE has yet to provide the Division with specific waste acceptance criteria for this treatment system However water from the OU 2 Subsurface IM/IRA SVE pilot test containing 100 ppb of CCl4 was treated in the system with only a 25% destruction efficiency This would tend to indicate that the system cannot handle water from all areas of OU 1 without dilution

Section 3 1 Development of Remedial Action Alternatives

Section 3 1 Page 3 1 Which option does the DOE consider containment with little or no treatment in the discussion on page 3 1 and 3 2 of this section Also which option eliminates the need for long term management?

Section 3 1 Page 3 2 The text states that a goal of remediation is achieving the groundwater RAO What about other RAOs? The goal is to meet all RAOs

Section 3 2 Groundwater Remedial Action Alternatives

Section 3.2 Page 3 2 This section develops groundwater remedial action alternatives but fails to consider the RAO of protection of groundwater from degradation by subsurface contamination All OU 1 alternatives must meet all OU 1 RAOs It is not appropriate to address groundwater at OU 1 without also addressing subsurface soils in developing remedial alternatives

Section 3.2.1 No Action Alternative Page 3 4 The text in this section states the no action alternative used the results of the BRA to define exposure under this alternative This alternative is not consistent with the BRA assumptions The BRA assumes the french drain is present

The text states that groundwater monitoring will continue under this alternative as long as institutional controls are active However institutional controls are not part of this remedial alternative The no action alternative allows for the site to be abandoned today without remediation or corrective measures to reduce risks

Section 3 2 2 Alternative 1 Institutional Controls The remediation time frame for the institutional controls alternative is the length of time for groundwater to drop to acceptable levels The assumption of 30 years for long term monitoring is not reasonable for this alternatives or other alternatives without active source control The modeling of IHSS 119 1 shows that most contaminants will be present at elevated levels long after 30 years

Section 3 2 4 Alternative 3 Modified French Drain with Extraction Wells

- The text on page 3 7 mentions potential sandstone lenses forming conduits for groundwater transport below the french drain? What is the basis for this hypothesis?
- Figure 3 1 is not consistent with the RFI/RI Figure 4 24 why? Has the DOE reinterpreted the extent of groundwater contamination on the hillside? The OU 1 boundary to the south has generally been considered the SID How was this new boundary determined and why has it been changed?
- The 881 Footing Drain water is not clean water It does not meet the current surface water discharge standards for Women Creek
- The correct reference for the IM/IRA treatment system is the final IM/IRA Decision Document
- How long does modeling show is needed for groundwater to reach acceptable levels of contamination? How was 30 years of long term monitoring selected for this alternative?
- Where in the RFI/RI Report is the hydraulic conductivity of IHSSs 119 1 and 119 2 areas presented?
- This alternative would have to be implemented for more than 30 years to achieve groundwater standards What is the basis for the assumption that the alternative can be implemented in 30 years?

Section 3 2 5 Alternative 4 Groundwater Pumping and Soil Vapor Extraction

- Page 3 10 Expand on the potential use of SVE at other DNAPL source areas on the hillside Where and under what criteria will this occur?
- Page 3 12 The text states that in addition to the SVE wells in IHSS 119 1 well would be installed in other areas if deemed appropriate When and how would other areas be deemed appropriate for SVE wells?
- Page 3 12 What is the basis for the estimate of five years for this

remediation to be implemented?

- Page 3 12 - The french drain does not serve an obvious useful purpose in this remedial alternative Why would it be necessary to operate the french drain for the five years that SVE remediation is being conducted and then after SVE is complete decommission the drain? The SVE operation requires the hillside to be dewatered Groundwater migration would be minimized and modeling results show contamination would not reach the drain until after it is decommissioned anyway
- Page 3-12 -- Do the SVE remedial options assume that the OU 2 SVE pilot system could be used for this operation? Is it included in the cost estimates?
- Page 3-13 Table 3 2 - Why is this table limited to primary VOCs in groundwater and how are primary VOCs distinguished from other VOC contaminants found in OU 1?

Section 3 2 6 Alternative 5. Groundwater Pumping and SVE with Thermal Enhancement

- Page 3 15 What is the rational for the selection of RF heating over Ohmic heating for the detailed analysis of alternatives? Why are two representative technology options being considered in this alternative when only RF heating is evaluated in the detailed analysis
- How was three years determined for operation of thermally enhanced SVE when non enhanced SVE is slated for only five years? It would seem that thermal enhancement could improve the remediation time by more that a factor of 2 As with alternative 4 why operate the french drain during SVE operation
- Page 3 22 Why would the french drain ever be utilized by another operable unit at RFETS?

Section 3 2 7 Alternative 6 Hot Air Injection and Mechanical Mixing

- Why does groundwater need to be extracted prior to the mechanical mixing operation?
- The DOE should consider more innovative alternatives than just steam injection under this alternative The injection of a slurry to stabilize the inorganic contamination may be an efficient option for treating selenium Also this system could be used to inject and mix bioremediation or dehydrohalogenation promoting slurries in an in-situ reaction
- If it is possible to drill 4 to 6 columns per day why does it take 3 years to complete this remediation?
- Why is it necessary to monitor groundwater for 30 years after the source is removed?

Section 3 2.8 Alternative 7 Soil Extraction and Groundwater Removal with Sump Pumps

- The text states that this alternative is designed to eliminate risk to residential receptors at OU 1 All receptors will benefit from reduced exposure to contaminated soils and groundwater This and all alternatives must be designed to meet ALL remedial action objectives not just residential exposure

- The concept of excavating down to the water table solely to locate contaminated groundwater is ridiculous This alternative targets the removal of residual contamination in the subsurface soils in the saturated and unsaturated zones Any groundwater collected during this alternative would include water in the contaminated soil matrix and groundwater seeping into the excavation from up-gradient of the hole If the residual soil contamination is properly removed the seep water should not be contaminated and thus not require treatment The Division questions the need to install sumps within the excavation and extract what should be clean water from the excavation Once the source of contamination to the soils is removed the only groundwater that could require treatment would be the contaminant plume down gradient of the excavation

- The classification of this alternative as worst case is not appropriate This alternative is the most aggressive most reliable and from a risk reduction perspective is the best case scenario

- This alternative illustrates the DOE s apparent lack of understanding of the RAOs for OU 1 and the concept of source removal The source of continued groundwater contamination at IHSS 119 1 is the residual and potentially free phase DNAPL in the soil matrix in the saturated and unsaturated zones The purpose of excavation is to completely remove the source of groundwater contamination in this case the contaminated soil matrix Once the source of groundwater contamination is removed the groundwater that has already been contaminated can be pumped and treated until the aquifer is restored to the appropriate standards There is not point to putting a sump in the excavation since the groundwater entering the sump should be up gradient for the contaminated groundwater plum

Section 4 0 Detailed Analysis of Alternatives

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The Division has not specifically commented on section 4 0 Detailed Analysis of Alternatives of this draft CMS/FS The Division finds that based on the number and significance of the unresolved issues the evaluation of section 4 is not warranted at this time This should not be construed as concurrence by the Division on anything contained in Section 4 of the draft CMS/FS

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Appendix B
Groundwater Modeling Results

Section B 3.0, Page B 3 & 4 Model Framework The percent of the total mass that desorbs appears to be so small for PCE that it doesn t make much difference when it is decayed by the model It would be helpful to quantify the assertions of conservative assumptions with examples from the mass balance results Because this is an introductory section reference should be made to a discussion in the results section Table 5-2 of the RI/RFI presents soil and ground water half life ranges Please discuss in more detail how the decay factor was chosen for each contaminant modeled

Slumping should be considered an ongoing process on this hillside Fractures too small for consideration of preferential water movement may not be too small to consider for DNAPL preferential movement present or reference calculations showing minimum fracture size for DNAPL invasion

Why would a decrease of saturated flow to zero at the french drain or extraction well be a problem with the TARGET model?

Section B 4 0, Page B 5, Calibration The water levels used to calculate the averages for calibration do not include all available water level data The RFEDS water level records contain data from 7/87 to 9/93 that was available to the Division before this modeling project began it should have been available to the consultant It was requested that pre and post french drain water levels be used to show calibration The average differences may be small and difficult to distinguish from wet or dry year effects but this data should have been analyzed for trends including any effects that may have resulted from shut down of irrigation ditches far upgradient If the results are not significant then an overall average is appropriate for a calibration target The table provided in the supplemental information should be included here

Why do flow errors increase to around 20% at 24 and 25 years? Please include the effect of the french drain and extraction well and indicate effect the this error has on the predictive simulations in this discussion

Contaminant mass lost in reverse infiltration needs to be compared to a vaporization model to verify the magnitude of the flux is comparable

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Section B 4 0, Table B 3a Measured Concentrations of VOCs at Well 4387 The result for 1 1 1 TCA for Feb 01 1990 is not consistent with the Division s sample results The Division s data reports 1 1 1-TCA as 13 000 ug/l not 500 U ug/l Was this error carried through the entire modeling effort? The Division questions the validity of the Jun 07-1990 and Jun-07-1990 sampling events? Has this data been validated? Why were these wells sampled two days in a row? Only one result per quarter should be included in the well averaging to avoid biasing the average Multiple results for a quarter should be combined into a quarter average before calculating a well average The Division was not able to reproduce the averages reported in this table are they correct?

Section B 5.0, Page B 6, Results Inclusion of a table presenting comparison to post french drain water levels would improve this discussion Results of other simulations are included and the statement that the chemicals tend to behave similarly is not demonstrated by those results It would appear that transport between well 4387 and 0487 is not well explained for 1 1 DCE CCL4 1 1 1 TCA or selenium TCE and vinyl chloride are not simulated and should be included in this investigation as they are part of the PCE decay chain Other sources may contribute to CCL4 and selenium observed at well 0487 Decay of transported PCE and TCE would spread out the source of 1 1 DCE such that the single cell source may not be appropriate for this and succeeding decay products The source for PCE and TCE may extend into bedrock These are a few sources of error that were not discussed to explain these results

In modeling of metals such as selenium pH may be an important factor Please justify the use of a transport model rather than a geochemical model for selenium

Section B 6 0, Page B-7 - B 10, Uncertainty This qualitative section cannot take the place of a quantitative sensitivity analysis Discussion of these uncertainty factors has more to do with the conceptualization of what is important to model A sensitivity analysis deals with how uniquely the chosen parameters perform in the mathematical model Both are important discussions Use of only one release scenario is a non-conservative aspect of this modeling study

Section B 6 0, Table B4 Volatilization is considered in Risk Assessment those results should be compared to the mass lost from reverse infiltration to substantiate that the model is conservative with regard to this process

Sensitivity of the model to differences in layer hydraulic conductivity should be considered as well as heterogeneity

Sorption to clay surfaces is presented in the RFI/RI in Table 5 13 Distribution coefficients including this type of sorption were not discussed or included in the modeling What effect does this have on the uncertainty? Sensitivity analysis of the distribution coefficient would help assess that uncertainty

Recharge/discharge sensitivities should be discussed

The division disagrees that decay and transformation have little effect on the uncertainty of this model This assertion needs to be documented

The diffusion coefficient becomes more important as advective transport decreases as in the bedrock portion of this model

The Fedors model may have been insensitive to the size of the source but the location and concentration of the source are important

Section B 7, Page B-10, Predictions The Division does not agree that the model reproduces known conditions well enough to be used with certainty for predictive simulation However comments will be made for the results of the alternative simulations because they have been presented as justification for choices advocated in the body of the CMS/FS It is the Division s opinion than none of the alternatives modeled provides sufficient compliance with the State Ground Water Standards

Concentration data on all figures should be in micrograms rather than milligrams It would be helpful if the ground water standard were included on the figures as a straight line

Section B 7 1 Page B-10, No Action Alternatives Figure B 22 shows concentration contours dipping into bedrock There is no bedrock sampling data in this area to confirm this therefore the model is identifying a data gap The RFI/RI discussion of Extent of Contamination (Section 4 2 4 of the Draft Final) concludes that even higher concentrations of chlorinated solvents may exist in soils below sampled intervals Figure B-24 shows 1 1 DCE plume reaching the Woman Creek alluvium above the state standard of 7 ug/l Figure B 25 shows the PCE plume down gradient of the french drain above the 5 ug/l standard Figures B29 and 30 show CCL4 above the standard (0 3 ug/l) from the french drain to Woman Creek alluvium

Section B.7 2., Page B 11, Institutional Controls with French Drain These simulations raise questions about the effectiveness of the french drain figure B 33

shows PCE in bedrock below the french drain figure B-36 indicates the concentration is around 10 ug/l Figure 35 shows a sharp increase of 1 1 DCE to 4 5 ug/l at 160 years Figure B 37 shows PCE well above the standard in the Woman Creek alluvium Figure B-39 shows 1 1 1 TCA well above the standard of 200 ug/l in the Woman Creek alluvium Figure B 41 shows the CCL4 plume peaking(?) about 160 years well above the standard

Section B 7.3, Page B 11, Remediation Alternatives Figure B 46 shows 1 1 DCE peaking well above the standard for more than 100 years Figure B 47 shows PCE peaking above the standard near the french drain location for 150 years Figures B-51 and 52 show CCL4 above the standard between the french drain and the Woman Creek alluvium

Appendix C
OU-1 Residual Risk Calculations

The Division has reviewed both the discussion of PRG development for OU 1 in this document and in the Development of Remedial Action Objectives (TM 10) for OU 1 The Division s specific comments regarding the development of risk based PRGs are presented below Several deficiencies in the DOE s PRG methodology are delineated in the Division s comments Most of these deficiencies have been identified in previous Division comments on both TM 10 and in the Division s comments on DOE s Programmatic Risk Based Preliminary Remediation Goals (Final) These comments must be resolved to the Division s satisfaction before the Division will consider the Final CMS/FS to be complete

30 Year Adult Exposure Duration for Residential Scenario The DOE has made errors in the PRG calculations and then refuses to change them on the grounds that the same methodology was used in the RI/RFI In at least one case the use of an Exposure Duration of 30 years DOE used the correct methodology in the RI/RFI and now seems to be interpreting it incorrectly In the RI/RFI DOE listed children s exposure factors in a column right next to those factors used for adult exposure giving the impression that exposures over a 30 year duration were being calculated If DOE would check standard EPA guidance 24 years IS ONLY USED AS AN ADULT EXPOSURE DURATION WHEN AGE AVERAGING AND INCLUDING 6 YEARS OF EXPOSURE TO A CHILD, otherwise 30 years is used. 30 years has been determined by an EPA study to be the 90th percentile for the amount of time homeowners occupy one residence (EPA 1985) Whenever DOE does not calculate exposure to children as well as to adults it must use the 30 year standard default exposure duration or provide site specific evidence indicating that another number is better This default factor is referenced in EPA s Exposure Factors Handbook (1989) and numerous other EPA publications It is a standard exposure duration routinely used as a default Both CDPHE and the EPA have consistently made this comment since the RI/RFI first came out and DOE has had plenty of time to check its assumptions If DOE made the incorrect assumption in the RI/RFI that 24 years was an adult exposure duration it must now recalculate all those incorrectly calculated intakes for use in later documents

Subsurface Soil Exposure for Residents - The Division has been asking for the evaluation of this pathway for several years and has successfully argued for this exposure pathway to be used in the RBC calculations The DOE has agreed to calculate residential exposure to subsoil for calculating the RBCs to be used for the OU2 conservative screen The same comment was made for OU6 and the DOE has agreed to do the same calculation there The Division also made this comment when

reviewing the programmatic PRGs We expect DOE to communicate this information to all sections and to comply consistently across all OUs even OU1

Volatilization Factors The Division has not been able to find the source for the volatilization factor for indoor use 0 065 m/m^3 in air per mg/L of water The DOE stated in their responses to CDPHE comments on TM 10 that it was taken from the OU1 BRA However the Division could not find this factor in that document either In order to verify DOE s calculations the Division requires the source of any site specific factor and/or the presentation of the calculation by which it was derived The Division specifically requires that the DOE include the original source of the volatilization factor for indoor use in both its response to this comment and the Final CMS/FS document

Inhalation of Indoor VOCs from Basement Vapors The EPA commented on TM 10 that since inhalation of indoor VOCs from basement vapors is an exposure route for future residents exposed to contaminants in groundwater it must also be put into the calculation of PRGs for this scenario DOE s combined groundwater PRG equation on page 19 of TM 10 includes only groundwater ingestion dermal contact with groundwater and inhalation of VOCs from indoor water use It does not specifically include the additional exposure from inhalation of indoor VOCs from basement vapor There are two possible routes by which indoor air may become contaminated by polluted groundwater and it is not clear to the Division that DOE s method of linearly extrapolating the basement concentration from the groundwater concentration takes both of those routes into account The Division requests confirmation that it does or does not

Page 17, TM 10 The DOE did not calculate subsurface soil PRGs because they claim that the Baseline Risk Assessment showed this media does not present a risk greater than 1 E 6 or a hazard index greater than one However DOE calculated those risks based on a construction worker scenario something which CDPHE has objected to for a long time The construction worker scenario used by DOE only evaluated an exposure duration of 1 year and an exposure frequency of 10 days/year Time probably has the greatest effect on any intake and risk calculations Therefore it is possible that when the subsoil risk calculations are done for the residential scenario that risks may exceed 1 E 6

Page 20, TM 10 The Division has reluctantly agreed to drop its demand that a quantitative assessment of dermal toxicity be included in the PRG/RBC calculations because of the lack of EPA dermal toxicity factors However before a site can be dropped if the cumulative site wide risk is less than 1 after going through the CDH

Conservative Screen process DOE agreed to perform a qualitative dermal assessment following the criteria in Chapter 9 (see Figure 9-1) and other sections of EPA s Dermal Exposure Assessment Principles and Applications (Interim Report) (EPA/600/8 91/011B January 1992) This is particularly necessary because DOE found in the BRA that dermal contact with soil at OU 1 was one of the exposure routes which was driving the risk (TM 10 page 8)

The latest EPA guidance on dermal risk assessment states that More soil is dermally contacted than is ingested during normal exposure scenarios Dermal absorption from soils appears to be more significant than direct ingestion for those chemicals which have a percent absorbed exceeding about 10% and Any compounds that are acutely toxic to the skin are important to consider even if less exposure occurs by skin contact than other routes (Draft Risk Assessment Guidance for Superfund Vol I Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance Office of Emergency and Remedial Response Toxics Integration Branch September 21 1992) The dermal route of exposure has long been recognized as a significant contributor to the accumulation of PCBs in the adipose tissue of workers in the capacitor manufacturing industry (ATSDR Toxicity Profile on PCBs 1993) While I could not find a reference that stated the average percent of a dermal exposure of PCBs absorbed through human skin the ATSDR Toxicity Profile on PCBs states that absorption efficiency ranged from about 15% to 34% of the applied radioactive PCB dose in monkeys and ranged from about 33% to 56% of the applied PCB dose in guinea pigs Therefore I am particularly concerned about potential human exposure to PCBs in OU1 soil by the dermal route and do not want the DOE to ignore it In addition there is some evidence that PAHs can produce mild acutely toxic effects to the skin such as ultraviolet sensitization (ATSDR Toxicity Profile on PAHs 1993) Thus both of these groups of chemicals should be assessed qualitatively for dermal toxicity after exposure to contaminated soil either in the OU 1 or OU 2 assessment

Page 23, TM 10 -- The Division does not understand what DOE means by the statement that The PRGs for PAHs or Aroclor-1254 in surface soil were estimated using the plant ingestion portion of equation 10 Was this the only pathway that was included when DOE calculated the PRGs for these groups of chemicals? If so what was the rationale? If indeed the other appropriate pathways were not included in the PRG calculation a thorough discussion of the underestimation of risk associated with this procedure must be supplied

Page 25, TM 10 Why were the terms involving plant ingestion deleted from the surface soil PRGs calculated for the radionuclides? The methodology in Baes et al

1984 which according to Rick Roberts was used as the source of equations to derive plant uptake factors originally was developed for use with radionuclides (Baes et al 1984 A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides Through Agriculture)